

Knowledge, attitude and practice of bariatric surgeries among Saudi population: A cross sectional survey

To Cite:

Mahmoud MIH, Khojah MN, Alreheily EA, Halabieh SA, Khoshaim FM, Nasser AA. Knowledge, attitude and practice of bariatric surgeries among Saudi population: A cross sectional survey. *Medical Science*, 2021, 25(113), 1748-1757

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Peer-Review History

Received: 02 June 2021

Reviewed & Revised: 04/June/2021 to 08/July/2021

Accepted: 09 July 2021

Published: July 2021

Peer-review Method

External peer-review was done through double-blind method.

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ABSTRACT

Background: Obesity is a major community health problem worldwide including Saudi Arabia due to its high morbidity and mortality rates. About one third of the Saudi community has obesity. **Objectives:** To assess knowledge, attitude, and practice of Saudi population towards bariatric surgeries, determine the prevalence of these surgeries among population and identify side effects and factors affecting them. **Methods:** A cross-sectional study using a structured pre-coded closed-ended, pilot tested online questionnaire was used, which include demographic data, medical history, knowledge, attitude, and practice of bariatric surgeries targeting male and female Saudi participants aged more than 18 years. Descriptive statistics and a univariate analysis were used. Multivariate analyses forwarded stepwise method was conducted. **Results:** Mean knowledge score percent was 76.3% (22.28). Those with satisfactory knowledge have worse medical history (54.1%, $p=0.035$), more significant attitude aspects; with their overall score of 71.7% ($p=0.012$). Significant independent predictors of bariatric surgeries were age (adjusted OR=2.5, 95% CI=1.3, 5.9), work status (adjusted OR=1.6, 95% CI=1.1, 2.6), marital status (adjusted OR=3.3, 95% CI=1.6, 8.8), and BMI (adjusted OR=2.1, 95% CI=1.3, 3.5). **Conclusion:** Obesity is a major health problem accompanied by many hepatics, gastrointestinal, respiratory, and cardiac complications. Elective bariatric surgeries are the solutions selected by more than half of cases. Nevertheless, Saudi populations' KAP towards bariatric surgeries regarding benefits, complications, indications, modalities are still unfavorable.

Keywords: KAP; Obesity; Bariatric surgeries; Saudi population, Gastric sleeve.

1. INTRODUCTION

Obesity is a major community health problem all over the world even in Saudi Arabia (SA). During the last 30 years, its prevalence has increased from 7% to 25%. It is suspected to affect 60% of the world's population by the year 2030



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(Kelly et al., 2008). Morbid obesity (BMI>40kg/m²) affecting 2.4% of the world's population (Stegenga et al., 2014). Obesity results from complex interactions between genetics, epigenetics, cultural and environmental parameters (Farooqi et al., 2005). It is an important risk factor for development of many chronic diseases like diabetes, hypertension, cardiovascular diseases, sleep apnea, some liver and musculoskeletal diseases and cancer (Alkhaldy et al., 2015; Fetuga et al., 2011). Bariatric surgeries are procedures that induce weight loss through restriction of food intake and malabsorption of ingested food (Andersen et al., 2016). They are indicated for pre-obese or obese individuals with one or more associated comorbidity when other methods of weight reduction failed (Kizy et al., 2017).

In Saudi Arabia, where one third of its population suffer from obesity; the preferred way for weight reduction is elective bariatric surgeries with their upward trend (Alkhaldy et al., 2015; Fetuga et al., 2011). There are plenty of bariatric surgery procedures (Stegenga et al., 2014). Roux-en-Y Gastric Bypass is the 'gold standard' of weight loss surgeries. It is the most prevalent bariatric surgery worldwide and second one in Saudi Arabia (Stegenga et al., 2014). Sleeve gastrectomy (SG) causes weight reduction through appetite reduction as a result of ghrelin hormone reduction (Karmali et al., 2010). It is the second most commonly performed bariatric procedure worldwide meanwhile In Saudi Arabia, it is the most frequent procedure (Angrisani et al., 2015). Laparoscopic adjustable gastric banding accounts for 10% of global bariatric surgeries are less frequently used in Saudi Arabia. Biliopancreatic diversion with duodenal switch is a less frequently performed procedure both nationally and internationally (Karmali et al., 2010; Angrisani et al., 2015).

Patient' perception of bariatric surgeries (types, indications, beneficial health effects, short and long term health consequences) is an important issue. This will guide him to decide which type he could electively select and could reduce post-operative morbid psychological effects and maintain weight loss (Courcoulas et al., 2013). Researches about bariatric surgeries are mainly of clinical point of view. There are scanty researches that handle the knowledge, attitude and practice of population towards bariatric surgeries and their effects and complications. With the upward increasing trend of obesity in the Saudi society, therefore this study was carried out. As it's aimed to assess knowledge, attitude, and practice of Saudi population towards bariatric surgeries, determine the prevalence of these surgeries among population, and identify side effects and factors affecting them.

2. SUBJECTS AND METHODS

Study context and design

Cross-sectional study using online questionnaires are conducted by researchers from Ibn Sina National College for Medical Studies (ISNC) starting from August to October 2020 (with 3 months duration).

Sampling

A voluntary response convenient sample of male and female Saudi participants aged between 18 and 60 years and more were included. The sample size was arrived at using the margin of error approach as seen in the equation below;

$$n = Z^2 P(1-P) / d^2$$

Where n is the sample size, Z is the statistic corresponding to confidence level, P is expected prevalence (that can be obtained from same studies or a pilot study conducted by the researchers), and d is precision (corresponding to effect size) (Daniel, 2018). After using the above equation, the sample size was set at 713 participants divided into two groups according to their knowledge satisfactory score.

Data Collection Methods

A structured pre-coded closed-ended, pilot tested questionnaire in Arabic was developed by the research team. It included the following data: demographic data (age, sex, marital status, education, occupation, and life styles), medical history, knowledge, attitude and practice of bariatric surgeries. The reliability of the questionnaire (content validity) was tested by SPSS using the Cronbach's alpha test ($r = 0.86$).

Ethical Considerations

Ethical approval for the study was obtained from Ibn Sina National College (ISNC) Research and Ethics Committee (IEC Ref No: H-04-13082020) in accordance with the declaration of Helsinki for Human Studies (World Medical Association Declaration of Helsinki, 2008). The Participation in the study was voluntary and during the online survey, the participants were all informed about the

purpose of the study and their right to refuse participation. Ethical conduct was maintained during data collection and throughout the research process.

Statistical analysis

Data was collected and entered the SPSS version 22 (SPSS Inc., Chicago, IL). The internal comparison of those who had unsatisfactory and satisfactory knowledge about bariatric surgeries was done. The descriptive statistics was carried out for all variables. A univariate analysis Chi-square test and independent t-test were used. To control for potential confounding, multivariate analyses forwarded stepwise (Wald) method was conducted to determine the independent predictors of KAP. Variables included in the multivariate analysis were age plus selected variables. For each variable, the age-adjusted prevalence odds ratio (OR), and the 95% CI were presented and computed directly from the logistic regression. A p-value < 0.05 is considered as a statistically significant. The mean percent scores for knowledge, attitude, practice, and overall score were calculated using the following formula:

Mean percent score = $\frac{\sum \text{Scores of questions selected}}{\text{maximum possible score for these questions}} \times 100$

The answers of questions that were considered in calculation were scored (if binary question, it would be 1 for no and 2 for yes), and the actual answers for that questions were summated. Then, the maximum possible score that could be obtained for those questions was calculated. Using the above formula, the score was calculated. To calculate the mean percent score, the mean value \pm SD was multiplied by 100.

For knowledge score, both benefits and complications were considered and then the cutoff point for unsatisfactory score was determined to be <60%. Group 1 refers to those with score less than 60% and group 2 for those with score of more than 60%. The variables that were included in calculation of knowledge mean percent score were presented in table (1).

Table 1 Variables Used in Calculations of Mean Percent Knowledge Score.

Knowledge of complications of bariatric surgeries	Knowledge of benefits of bariatric surgeries
Acid reflux	Weight loss
Anesthesia-related risks	Improvement of diabetes
Chronic nausea and vomiting	Improvement of cardiac state
Dilation of esophagus	Improvement of blood pressure level
Inability to eat certain foods	Improvement of sexual function
Infection	Improvement of sleep pattern
Obstruction of stomach	Improvement of sleep apnea
Weight gain or failure to lose weight	Improvement of the ability to exercise
Internal bleeding or profuse bleeding of the surgical wound	Increase fertility level
Leakage Perforation of stomach or intestines	Improvement of joint movement
Pouch/anastomotic obstruction or bowel obstruction	Improvement of muscle power
Low blood sugar	Decreased depressive attacks
Hernia	Decreased anxiety level
Nutritional deficiencies	
Gall stones	
Pulmonary and/or cardiac problems	
Skin separation	
Spleen or other organ injury	

The following variables were used for calculation of *attitude score*: desire to reduce weight, desire to do bariatric surgery, advice given by the participants to others to do bariatric surgeries, and desire to search for updates for bariatric surgeries. For calculation

of the *practice score* the number of participants who had bariatric surgeries, indication, immediate and late complications, effect on life styles and psychological state were considered.

3. RESULTS

The mean knowledge score is 76.3% (22.28); where 335 of participants (47.0%) have unsatisfactory score percent (group 1) and 378 (53%) have satisfactory one (group 2). Group 2 has the following features: 57.1% are females, 98.1% have secondary education and more ($p=0.000$), 66.4% are working ($p=0.021$) and 43.9% are ever married ($p=0.028$). Their mean age is 30.7($p=0.002$) years, and the Body Mass Index (BMI) is 34.1($p=0.000$) (Table 2). Group 2 consume more healthy diet (68.5%; $p=0.020$), get enough sleep hours (46.0%; $p=0.053$) and more practicing exercise (59.5%; $p=0.031$) (Figure 1).

Table 2 Description of the Studied Participants (N=713)

Items	Group 1		Group 2		Total		p-value
	N (335)	%	N (378)	%	N (713)	%	
Gender							0.461
Male	125	37.3	162	42.9	287	40.3	
Female	210	62.3	216	57.1	426	59.7	
Education							0.000*
Basic	32	9.6	7	1.9	39	5.5	
Secondary and more	303	90.4	371	98.1	674	94.5	
Work status							0.021*
Not working	95	28.4	127	33.6	222	31.1	
Working	240	71.6	251	66.4	491	68.9	
Marital status							0.028*
Never married	240	71.6	212	56.1	452	63.4	
Ever married	95	28.4	166	43.9	261	36.6	
Age							0.002*
Mean (SD)	25.3 (4.37)		30.7 (5.89)		28.4 (3.81)		
BMI							0.000*
Mean (SD)	30.8 (9.23)		34.1 (7.41)		32.5 (6.43)		
*P-value significant < 0.05 level							

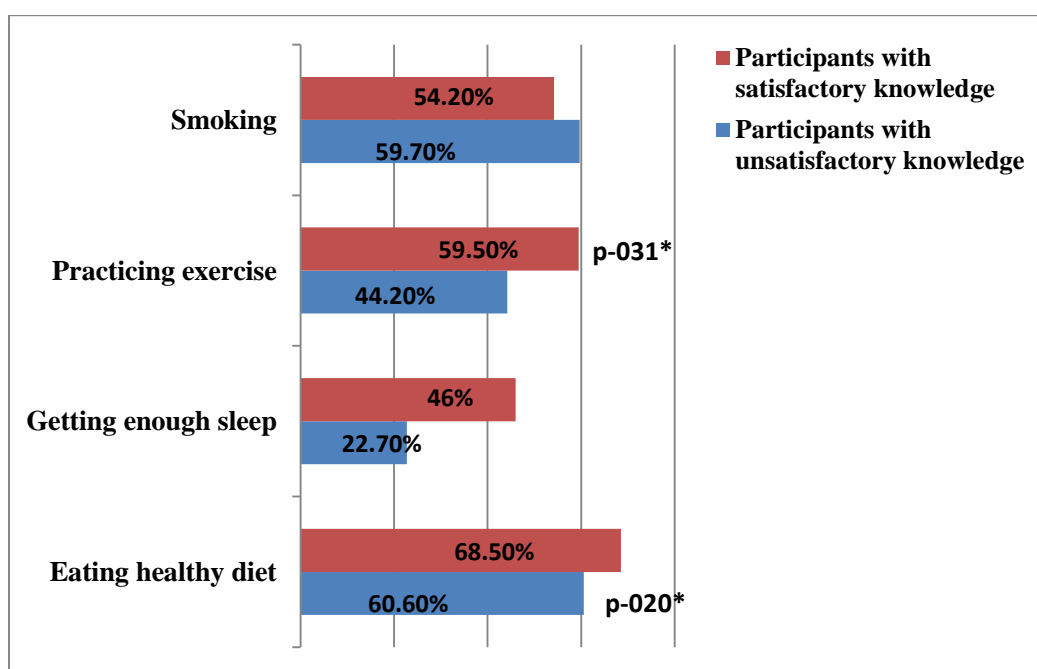


Figure 1 Lifestyles of the Studied Participants (N=713)

More than one third of women (35.7%; $p=0.051$) in group 1 has irregular menses, 11.4% ($p=0.068$) has hormonal imbalance and 53.4% ($p=0.035$) does not use hormonal contraceptives (Table 3). Group2 have worse medical history (54.1%, $p=0.035$) mainly for GIT diseases (66.9%; $p=0.000$), respiratory diseases (64.5%; $p=0.031$) and hepatic one (63.2%; $p=0.000$) (Figure 2).

Table 3 Gynecological and Obstetric History of the Studied Female Participants (N=426)

Items	Group 1		Group 2		Total		p-value
	N (210)	%	N (216)	%	N (426)	%	
Regularity of menstruation							
Regular	114	54.3	120	55.6	234	54.9	0.051
Irregular	75	35.7	61	28.2	136	31.9	
Menopause	21	10.0	35	16.2	56	13.2	
Presence of hormonal imbalance							
No	186	88.6	193	89.4	379	89.0	0.068
Yes	24	11.4	23	10.6	47	11.0	
Use of hormonal contraceptives							
No	101	53.4	89	41.2	190	44.6	0.036*
Yes	88	46.6	127	58.8	215	55.4	
Number of pregnancies							
Mean (SD)	3.5 (2.19)		3.9 (2.71)		3.7 (1.96)		0.098
Number of deliveries							
Mean (SD)	2.9 (1.53)		3.6 (2.29)		3.3 (1.84)		0.121
*P-value significant < 0.05 level							

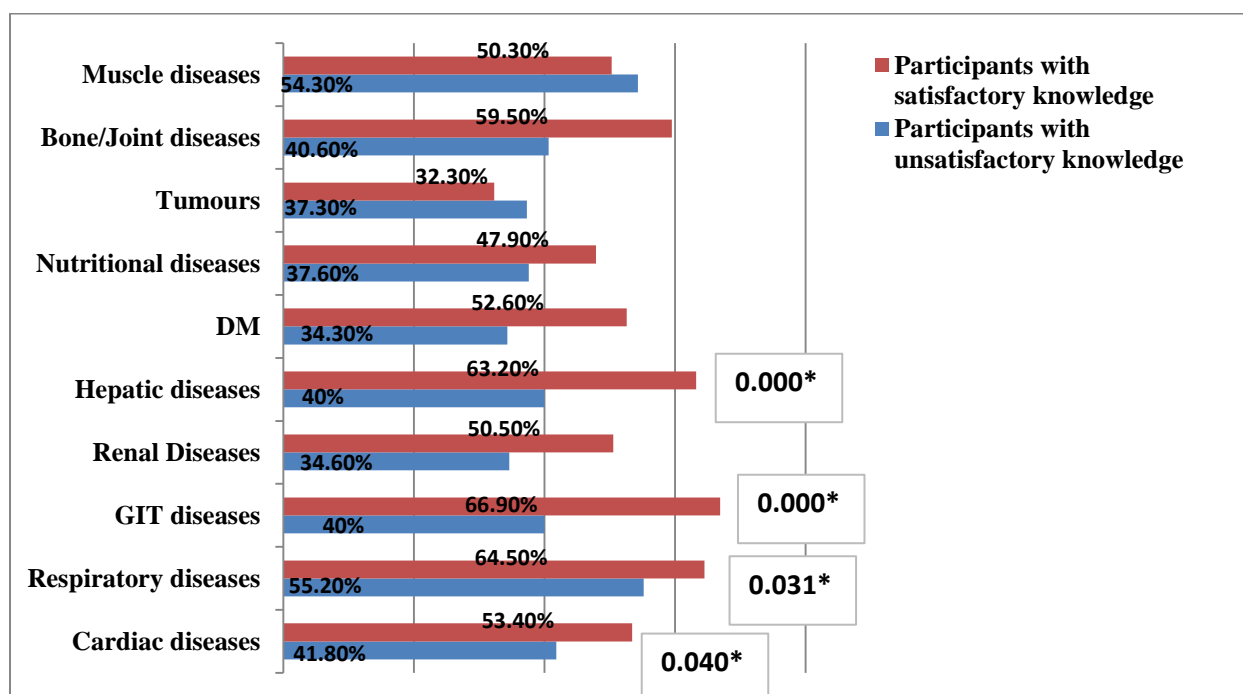


Figure 2 Medical History of the Studied Participants (N=713)

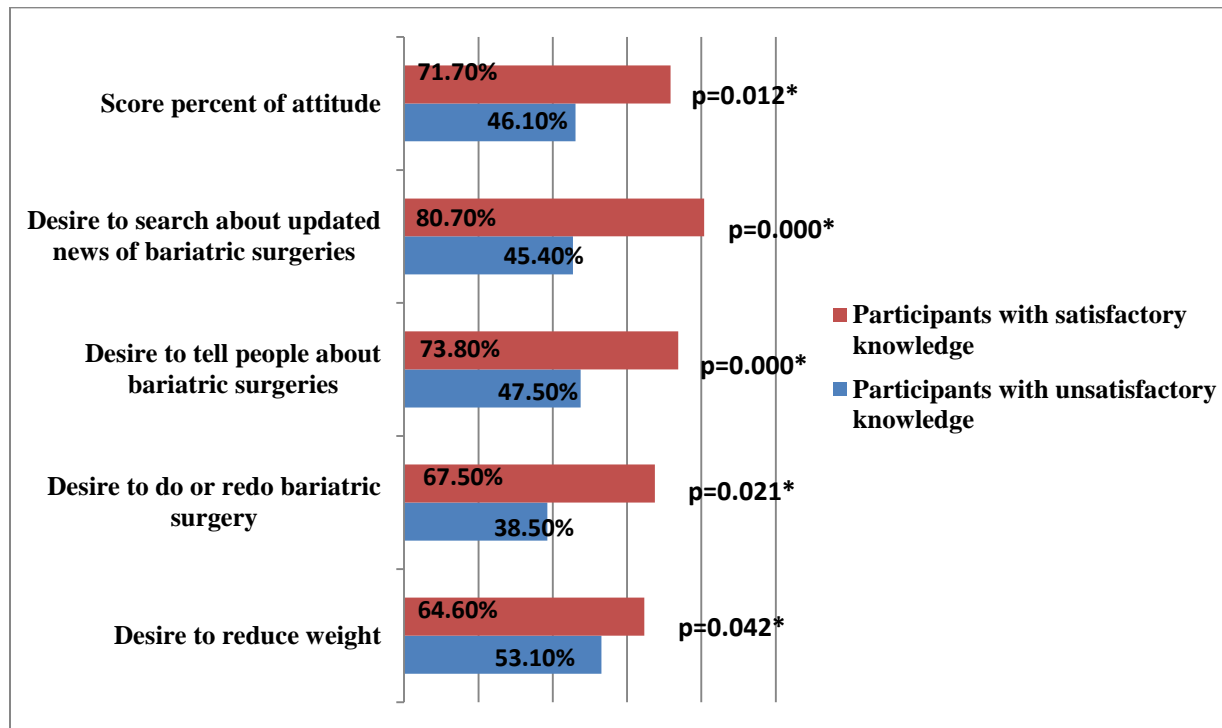


Figure 3 The Participants' Attitude towards Bariatric Surgeries (N=713)

They also have more significant percentages in all aspects related to attitude; with their overall attitude score of 71.7% (p=0.012) (Figure 3). Elective surgeries were done for 55.2% (p=0.042) of participants in group 2 although they encountered both immediate and late complications (13.4%; p=0.007, 7.5%; p=0.135 respectively). Those in group 1 obtained marked improvement of their psychological state (81.2%; p=0.002). Gastric Sleeve was insignificantly the main operation performed (59.3% and 59.7% respectively). Meanwhile insignificant marked weight loss occurred in both groups (62.5% and 62.7% respectively), only 68.8% and 77.6% were satisfied with their body images (p=0.039). The mean percent score for practice of bariatric surgeries was significantly higher in group 2 (68.9%; p=0.018) (Table 4).

Table 4 Description of the Participants Performed Bariatric Surgeries (N=99)

Items	Group 1		Group 2		Total		P-value
	N (32)	%	N (67)	%	N (99)	%	
Indication for operation							
Elective	13	40.6	37	55.2	50	50.5	0.042*
Medically indicated	19	59.4	30	44.8	49	49.5	
Occurrence of immediate complications							
No	29	90.6	58	86.6	87	87.9	0.007*
Yes	3	9.4	9	13.4	12	12.1	
Occurrence of late complication							
No	30	93.7	62	92.5	92	92.9	0.135
Yes	2	6.3	5	7.5	7	7.1	
Improvement of lifestyles							
No	5	15.6	3	4.5	8	8.1	0.192
Yes	27	84.4	64	95.5	91	91.9	
Effect on psychological state							
No effect	1	3.2	12	17.9	13	13.1	0.002*
Depression	5	15.6	11	16.4	16	16.2	
Improvement of psychological state	26	81.2	44	65.7	70	70.7	

Type of bariatric surgery done							
Balloon	3	9.4	4	6.0	7	7.1	0.023*
Gastric by-pass	10	31.3	23	34.3	33	33.3	
Gastric Sleeve	19	59.3	40	59.7	59	59.6	
Weight outcome after surgery							0.031*
Marked weight loss	20	62.5	42	62.7	62	62.6	
Little weight loss	12	37.5	11	16.4	23	23.3	
Unfavorable	0	0.0	14	20.9	14	14.1	
Satisfaction with body image							0.039*
Satisfied	22	68.8	52	77.6	74	74.7	
Not satisfied	10	31.2	15	22.3	25	25.3	
Weight before operation in Kg							0.039*
Mean (SD)	118.5(20.58)		139.9 (10.47)		129.2 (15.67)		
Duration lapse in years							0.351
Mean (SD)	1.9 (0.56)		1.6 (0.63)		1.8 (0.53)		
Mean percent score of practice of bariatric surgery	46.2(8.94)		68.9 (6.54)		57.6 (7.62)		0.018*
*P-value significant < 0.05 level							

In the logistic regression analysis, after controlling for the confounding factors, significant independent predictors of Bariatric surgeries' KAP of Saudi population were age (adjusted OR=2.5, 95% CI=1.3, 5.9), work status (adjusted OR=1.6, 95% CI=1.1, 2.6), marital status (adjusted OR=3.3, 95% CI=1.6, 8.8), BMI (adjusted OR=2.1, 95% CI=1.3, 3.5). These variables explain 79 % of variables predicting the KAP ($R^2 = 0.786$) with overall significant model ($p = 0.001$) (Table 5).

Table 5 Multivariate logistic regression analysis of significant predictors for Bariatric surgeries' KAP among Saudi population

Independent variable	OR	95% CI for OR	P value
Constant	1.3	1.1–1.8	0.001*
Age (years)	2.5	1.3–5.9	0.010*
BMI	2.1	1.3–3.5	0.002*
Work status	1.6	1.1–2.6	0.038*
Marital status	3.3	1.6–8.8	0.017*
OR = odds ratio; CI = confidence interval; * P value is significant if $P < 0.05$. Dependent variable encoding negative = 0, positive = 1 $R^2 = 0.786$			

4. DISCUSSION

Our study was designed to assess knowledge, attitude, and practice (KAP) of Saudi population towards bariatric surgeries, determine their prevalence and identify side effects and factors affecting them. The participants were divided according to their knowledge score into two groups; group 1 (47.0%) of participants with unsatisfactory score and group 2 (53.0%) with satisfactory one. Group 2 participants have mean (SD) BMI of 34.1(7.41), eat healthier diet (68.5%), get enough sleep hours (46%) and more practicing exercise (59.5%). The comparisons between the two groups in terms of their age, marital status, education, work status, and BMI were statistically significant.

The present research work revealed that more than half of participants were females; 55.4% of them are using hormonal contraceptives. This was concomitant with the study participants in a similar research in Taif, KSA (Alqurashi et al., 2017); where about two thirds of participants were females. This could be attributed to high prevalence of obesity among women than men. The current study stated that 53.0% of the participants have satisfactory knowledge regarding bariatric surgeries which is higher than the result reported in previous similar study. This could be attributed to the widespread use of social media; especially during COVID-19 pandemic which increase the awareness of population about importance of weight reduction and its tools including bariatric surgeries. Abouhamda et al., (2016) proved that the knowledge level is affected by age, BMI, work, and marital status. In our work, these factors were also extracted as predictors of knowledge level among the study participants.

In study done by Alqurashi et al., (2017) stated that acquiring healthy lifestyles will increase the awareness about dangers of obesity and its preventive measures. That was proved in the current work where the participants with satisfactory knowledge score have good lifestyles including practicing exercise, getting enough sleep, and consuming healthy diet and less smoking habit (Alreshidi et al. 2020; Alrashid et al. 2021). In a study by Weaver et al., (2019) proved that obese persons with poor medical history seek medical advice and have more knowledge than others. This comes true for our results where participants with good knowledge have more hepatic, gastro-intestinal, respiratory, and cardiac morbidities. Alfahdel et al., (2020) concluded that good knowledge is mandatory to treat obesity and know benefits and hazards of bariatric surgeries. The same is obtained in the current research where 68.9% of those with satisfactory knowledge treat their obesity state by bariatric surgeries.

Our results proved that there are many factors affecting on the choosing of the bariatric surgeries to treat obesity are influenced by age, educational level, BMI, work, and marital status. More than half (55.2%) of bariatric surgeries were performed electively. The surgery improves psychological status, lifestyles and satisfaction with body image. Similar findings were reported by Altaf, (2019) & Abbas, (2019). Nevertheless, minorities experienced either immediate or late surgical complications. The complication rates of bariatric surgery in centers of excellence are relatively low. Success with bariatric surgery is increased when clinicians assess, diagnose, treat, monitor, and evaluate individuals both before and after surgery (Lau et al., 2006; National Institutes of Health consensus, 1992; National Institutes of Health Gastrointestinal surgery, 1991; Andrade et al., 2016).

Media are an important factor in influencing the public's view towards bariatric surgery. Choosing bariatric surgery to manage one's morbid obesity is affected by the perception of bariatric surgery, accessibility, finances, and cost. Bariatric surgeries are indicated for those who failed to achieve appropriate weight loss with lifestyle modifications, nutritional and medical managements and for those who are at high risk of morbidity and mortality suffering from the complications of obesity (Lau et al., 2006; National Institutes of Health consensus, 1992; National Institutes of Health Gastrointestinal surgery, 1991; Andrade et al., 2016).

5. CONCLUSION

Obesity is a prevailed problem accompanied by many complications (hepatic, gastrointestinal, respiratory, and cardiac complications). Elective bariatric surgeries are the solutions selected by more than half of cases. Nevertheless KAP of bariatric surgeries regarding benefits, complications, indications, modalities among Saudi population are still unfavorable. Factors affecting KAP include age, education, BMI, work and marital status.

Recommendation

Adopt a multidisciplinary approach (psychiatric, nutritional, and medical) through media and health care sectors to increase knowledge and attitude towards bariatric surgeries in terms of the surgery preparation or follow up.

Study limitations

The method of data collection through online questionnaire and not a community based; with sampling technique (a voluntary response sample) both limit the generalization of the results.

Acknowledgement

We thank the participants who were responded to our study online survey. Also, great appreciation to ISNC administrations for all facilitations provided for this research.

Author Contributions

MI conceptualized the study, supervised the study procedures, contributed to data collection, analysis, and interpretation, and drafted the first manuscript. MN and EA designed the survey, helped with data acquisition, analysis, and interpretation of the results and the first draft of the overall manuscript. SA shared in reviewing the literature and the introduction section, in addition to data collection. FM and AA contributed to quantitative data collection and analysis and interpretation of the results. MI and AA made the essential contributions, critically reviewed, and approved the final manuscript.

Funding

This study has not received any external funding.

Conflict of Interest

The authors declare that there are no conflicts of interests.

Ethical approval

This study was approved by the Medical Ethics Committee of Ibn Sina National College (ISNC) (IEC Ref No: H-04-13082020).

Data and materials availability

All data associated with this study are present in the paper.

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